Our Ref.: 2075

Non-Provisional Patent

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Stanford R. Ovshinsky, Boil Pashmakov, David V. Tsu

Serial Number: 09/971,881

Group Art Unit: 1771

Filing Date: October 5, 2001

Examiner: H. Vo

For: SEMICONDUCTOR WITH COORDINATIVELY IRREGULAR STRUCTURES

Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION UNDER 37 CFR 1.132

Dear Sir:

I, Boil Pashmakov, do hereby declare and say:

1. I am an inventor of the invention disclosed in U.S. Pat. Appl. Ser. No. 09/971,881, entitled "SEMICONDUCTOR WITH COORDINATIVELY IRREGULAR STRUCTURES", filed on October 5, 2001.

2. I am familiar with the Office Action of March 27, 2003, as well as the Ovshinsky reference (US 6,087,580) cited by the Examiner and understand the subject matter thereof.

3. I contend that the material disclosed in the subject application 09/971,881 is distinguishable from the material disclosed in the Ovshinsky reference for the following reasons:

a. The central structural unit of the material of subject application 09/971,881 is a coordinatively irregular structure having as a distinguishing feature a bonding configuration of silicon that is distorted from a regular tetrahedral bonding configuration. The non-tetrahedral distortions include angular deviations from the regular tetrahedral bond angle of 109.5°. The presence of these distortions leads to disorder within a coordinatively irregular structure, a lack of periodicity and the establishment of novel properties (e.g. bandgap energy, refractive index) relative to amorphous or crystalline silicon.

b. In contrast, the central structural unit of the material of the Ovshinsky reference (US 6,087,580) is an atomic aggregation that is highly ordered and in the form of ordered clusters where the ordered clusters are crystallites within a certain size range. The atomic aggregations of the Ovshinsky reference show periodicity and propagation of local order, where the length scale over which the periodicity and propagation of local order extends is distinguished from the long range order present in crystalline silicon. The attainment of a highly ordered state showing a degree of periodicity and propagation of local order in the central structural unit of the Ovshinsky reference requires the presence of a bonding configuration for silicon that is either regular tetrahedral or at most shows vanishingly small deviations from the regular tetrahedral bond angle of 109.5°.

c. The non-tetrahedral distortions present in the coordinatively irregular structures of the subject application 09/971,881 are incompatible with the periodicity and propagation of local order present in the atomic aggregations of the Ovshinsky material and lead to the conclusion that the coordinatively irregular structures of the subject application 09/971,881 and the atomic aggregations of the Ovshinsky reference are distinct structural entities.

Whereas the bonding configuration of the coordinatively irregular structures of the subject application 09/971,881 is irregular, the bonding configuration of the atomic aggregations of the material of the Ovshinsky reference is regular.

d. Based on the disclosure of the Ovshinsky reference and my knowledge of the subject matter therein, I assert that the coordinatively irregular structures of the subject application 09/971,881 do not coincide with and are not present in the atomic aggregations of the Ovshinsky reference.

e. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patents issuing thereon.

Signed:

Boil Pashmakov

Date: 06/12/03